



FALL PROTECTION INFORMATION

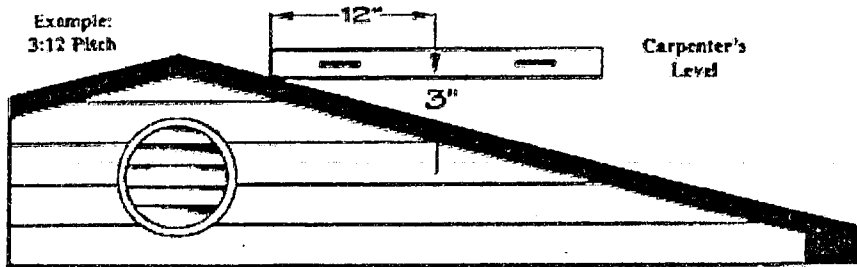
Determining Roof Pitch

DETERMINING ROOF PITCH

There are two different ways to determine your roof slope.

Method One

1. Take a carpenter's level and place it against your roof as show in the illustration below. Be sure it is level.
2. From the point where the level touches the roof, measure out 12 inches.
3. From this point, measure the distance in inches from the bottom of the level to the roof.
4. This will be the first number in the roof pitch. The second number is always 12.
5. Use the chart below (See Amount of Drop) to determine the amount you will need to drop the mark for the roof hole down the slope of your roof as indicated below.



Your "ROOF PITCH" is simply how far the roof drops vertically for every 12" of horizontal run.

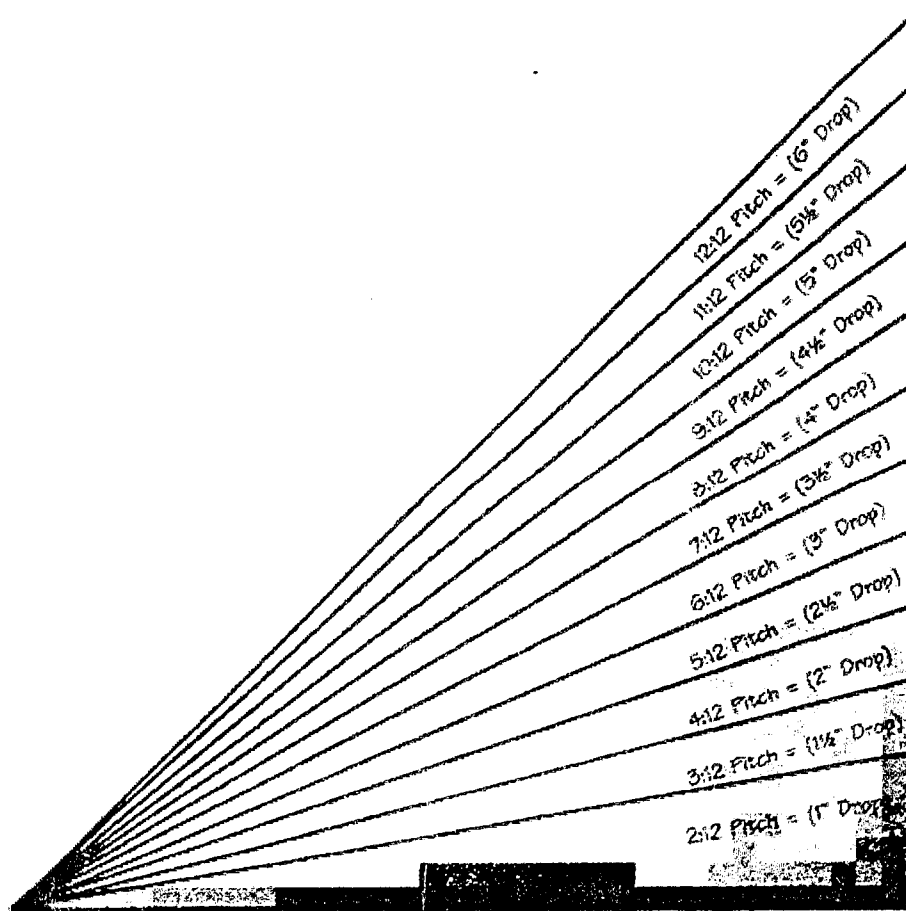
Method Two

1. Use our roof slope chart (See Slope Chart) and visually determine the pitch of your roof.
2. Corresponding to that pitch is a drop length. Drop the mark for the roof hole directly down the slope as indicated (See Roof Pitch Chart).

ROOF PITCH

Pitch	Amount of Drop
2:12	1"
3:12	1 ½"
4:12	2"
5:12	2 ½"
6:12	3"

7:12	3 1/2"
8:12	4"
9:12	4 1/2"
10:12	5"
11:12	5 1/2"
12:12	6"



Slope Chart

Personal Fall Arrest Systems

Personnel requiring the use of personal fall protection equipment shall employ the "Buddy System" or have an observer to render assistance when and if required.

There are three main components to the personal fall arrest system. This includes the personal protective equipment the employee wears, the connecting devices and the anchorage point. Prior to tying off to perform the work a means of rescue in the event of a fall must be immediately available. The system needs to meet the following criteria for each component:

Personal Protective Equipment

- **Full body harnesses are required.** The use of body belts is prohibited.
- The attachment point of the body harness is the center D-ring on the back.
- Employees must **always** tie off at or above the D ring of the harness except when using lanyards 3 feet or less in length.
- Harnesses or lanyards that have been subjected to an impact load shall be destroyed.
- Load testing shall not be performed on fall protection equipment.

Connecting devices

This device can be a rope or web lanyard, rope grab or retractable lifeline.

- Only locking snaphooks may be used.
- Horizontal lifelines will be designed by a qualified person and installed in accordance with the design requirements.
- Lanyards and vertical lifelines need a minimum breaking strength of 5,000 pounds.
- Lanyards may not be clipped back to itself (e.g. around an anchor point) unless specifically designed to do so.
- If vertical lifelines are used, each employee will be attached to a separate lifeline.
- Lifelines need to be protected against being cut or abraded

Anchorage

Secure anchor points are the most critical component when employees must use fall arrest equipment. UF buildings may have existing structures (e.g., steel beams that may meet the criteria for a secure anchor point). Other work locations and assignments may require the installation of a temporary or permanent anchor. As a minimum, the following criteria must be considered for each type of anchor point:

- Structure must be sound and capable of withstanding a 5000 lb. static load/person attached.
- Structure/anchor must be easily accessible to avoid fall hazards during hook up.

- Direct tying off around sharp edged structures can reduce breaking strength by 70% therefore; chafing pads or abrasion resistant straps must be used around sharp edged structures to prevent cutting action against safety lanyards or lifelines.
- Structures used as anchor points must be at the worker's shoulder level or higher to limit free fall to 6 feet or less and prevent contact with any lower level (exception – when self retracting lifelines and or 3 foot lanyards are used)
- Choose structures for anchor points that will prevent swing fall hazards. Potentially dangerous "pendulum" like swing falls can result when a worker moves horizontally away from a fixed anchor point and falls. The arc of the swing produces as much energy as a vertical free fall and the hazard of swinging into an obstruction becomes a major factor. Raising the height of the anchor point can reduce the angle of the arc and the force of the swing. Horizontal lifelines can help maintain the attachment point overhead and limit the fall vertically. A qualified person must design a horizontal lifeline.

Permanent Anchor Requirements

In addition to all the criteria listed above, the following points must be considered:

- Environmental factors and dissimilarity of materials can degrade exposed anchors.
- Compatibility of permanent anchors with employee's fall arrest equipment.
- Inclusion of permanent anchors into a Preventive Maintenance Program with scheduled annual re-certification.
- Visibly label permanent anchors.
- Anchors must be immediately removed from service and re-certified if subjected to fall arrest forces.

Reusable Temporary Anchors:

- Reusable temporary roof anchors must be installed and used following the manufacturer's installation guidelines.
- Roof anchors must be compatible with employee's fall arrest equipment.
- Roof anchors must be removed from service at the completion of the job and inspected prior to reuse following the manufacturer's inspection guidelines.
- Roof anchors must be immediately removed from service and disposed of if subjected to fall arrest forces.

Complete system

- If a fall occurs, the employee should not be able to free fall more than 6 feet nor contact a lower level.

To ensure this, add the height of the worker, the lanyard length and an elongation length of 3.5 feet. Using this formula, a six-foot worker with a six-foot lanyard would require a tie-off point at least 15.5 feet above the next lower level.

- A personal fall arrest system that was subjected to an impact needs to be removed from service immediately.
- Personal fall arrest systems need to be inspected prior to each use and damaged or deteriorated components removed from service.
- Personal fall arrest systems should not be attached to guardrails nor hoists.

Work from Aerial Lifts and Self Powered Work Platforms

Body harnesses must be worn with a shock-absorbing lanyard (preferably not to exceed 3 feet in length) and must be worn when working from an elevated work platform (exception: scissor lifts and telescoping lifts that can move only vertically do not require the use of a harness and lanyard as long as the work platform is protected by a guardrail system). The point of attachment must be the lift's boom or work platform. Personnel cannot attach lanyards to adjacent poles, structures or equipment while they are working from the aerial lift.

Personnel cannot move an aerial lift while the boom is in an elevated working position and the operator is inside of the lift platform.

Inspection

The employee will inspect the entire personal fall arrest system prior to every use. The competent person will inspect the entire system in use at the initial installation and weekly thereafter. The visual inspection of a personal fall arrest system periodically will follow the manufacturer's recommendations. An example of a complete inspection is in Appendix A.

Warning Line Systems and Controlled Access Zones

Warning line systems and work in controlled access zones must be developed in accordance with OSHA regulation 1926.502 and must be approved by EH&S or their designee before employees are exposed to fall hazards.

Monitoring System

OSHA emphasizes that safety-monitoring systems are a last resort and may only be used when other systems are infeasible or present a greater hazard. Monitoring systems must be developed in accordance with OSHA regulation 1926.502 and must be approved by EH&S or their designee before employees are exposed to fall hazards.

Appendix A Personal Fall Arrest System Inspection

All fall protection equipment shall be inspected before each use in accordance with the manufacturers instructions. The following is general guidance for the inspection of this equipment.

Harness Inspection Webbing

- Inspect the entire surface of webbing for damage. Beginning at one end, bend the webbing in an inverted “U”. Holding the body side of the belt toward you, grasp the belt with your hands six to eight inches apart. This surface tension makes the damaged fibers or cuts easier to see. Watch for frayed edges, broken fibers, pulled stitches, cuts, burns, and chemical damage.

“D” Rings/Back Pads

- Check “D” rings for distortion, cracks, breaks, and rough or sharp edges. The “D” ring should pivot freely. “D” ring back pads should also be inspected for damage.

Attachment of Buckles

- Note any unusual wear, frayed or cut fiber, or distortion of the buckles.

Tongue/Grommet

- The tongue receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted or broken grommets. The webbing should not have any additional punched holes.

Tongue Buckle

- Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. The roller should turn freely on the frame. Check for distortion or sharp edges.

Friction and Mating Buckles

- Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar.

Lanyard Inspection Hardware

- **Snaps:** Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper closes.
- **Thimbles:** The thimble must be firmly seated in the eye of the splice, and splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks.

Web Lanyard

- While bending the webbing over a curved surface such as a pipe, observe each side of the webbed lanyard. This will reveal any cuts or breaks. Examine the webbing for swelling, discoloration, cracks, or burns. Observe closely for any breaks in the stitching.

Rope Lanyard

- Rotation of the rope lanyard while inspecting from end to end will bring to light any fuzzy, worn, broken or cut fibers. Weakened areas from extreme loads will appear as a noticeable change from the original diameter. The rope diameter should be uniform throughout, following a short break-in period. Make sure the rope has no knots tied in it. Knots can reduce the strength of the rope by up to 60%.

Shock-absorbing Lanyard

- Shock-absorbing lanyards should be examined as a web lanyard. However, also look for signs of deployment. If the lanyard shows signs of having been put under load (e.g. torn out stitching), remove it from service.

Appendix B Definitions

Fall Protection System - Fall Protection Systems are designed to protect personnel from the risk of falls when working at elevated heights. Recognized systems include:

Fall Prevention - a structural design to limit a fall to the same level (e.g., guardrails, positioning/restraint systems).

Fall Arrest System - an approved full body harness, shock absorbing lanyard or self retractable lifeline, locking snap hooks and anchor points approved for a static load of 5000 pounds or engineered to meet a two to one safety factor.

Aerial Lift - Vehicle mounted elevating work platform (e.g. Boom Lifts, Articulating Telescoping Boom Lifts).

→ **Competent Person** - A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are hazardous to personnel and who has authorization to quickly correct the situation.

Qualified Person - A person with a recognized degree or professional certificate, (e.g. civil or mechanical engineering profession or Certified Safety Professional) and extensive knowledge and experience in this area, capable of doing design, analysis, evaluation and specifications.

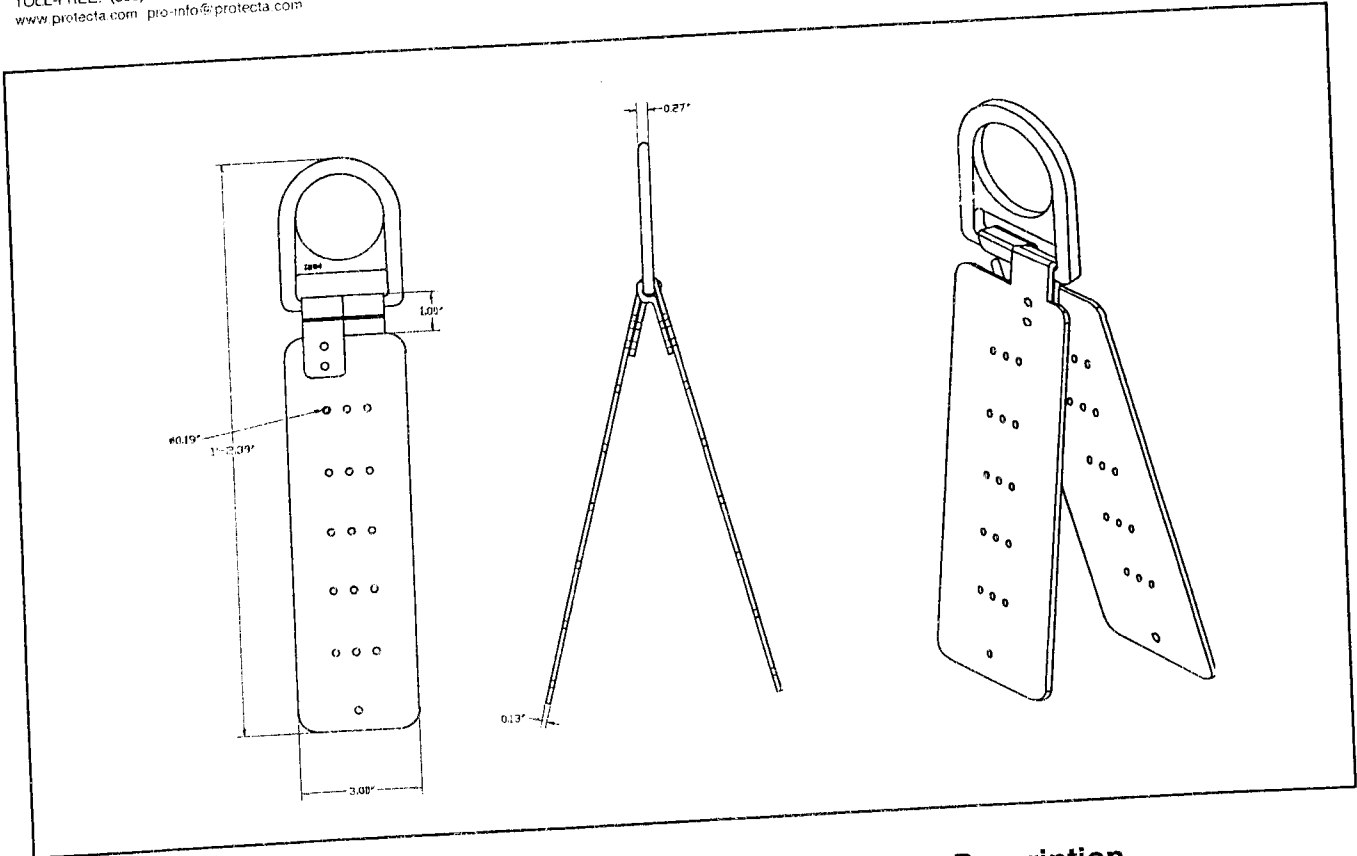
Certification - ANSI (American National Standards Institute) defines certification as documentation that determines criteria meets the requirements of the standard through testing or proven analytical method (e.g. engineering calculations) or both, carried out under the supervision of a Qualified Person..

- FULL-BODY HARNESSSES
- POSITIONING DEVICES
- SHOCK-ABSORBING LANYARDS
- CONNECTING DEVICES
- GUIDED TYPE FALL ARREST
- SELF-RETRACTING LIFELINES
- CONFINED SPACE SYSTEMS
- SKYSEAT WORKING CHAIR
- EMERGENCY ESCAPE DEVICES
- ANCHORAGE DEVICES
- HEAVY LOAD FALL ARRESTORS
- HORIZONTAL LIFELINES

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AJ730A

**Reusable
 Roof Anchor Bracket**



General

The AJ730A Reusable Roof Anchor is an anchorage device commonly used as the attachment point for a rope lifeline while performing residential roof construction. The AJ730A is stamped from 1/8" sheet metal, and has pre-drilled holes that facilitate anchorage to the roof through the use of 20 16D nails (included). A zinc plated forged D-ring at the top accommodates Protecta standard double locking snaphooks as supplied on the Pro and First range of vertical rope lifelines as well as an AJ514A carabiner. The AJ730 may be angled to accommodate various roof pitches, or may also be laid flat. The AJ730A is included as part of the AA7050A "Compliance in a Can" personal fall protection system.

Description

Construction

- Forged alloy zinc-plated D-Ring
- Painted steel construction
- 1/8" Steel sheet
- Powdercoated red for durability and visibility

Net Weight

- 3 lbs.

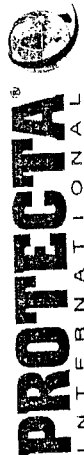
Compliance

- OSHA 1926 Subpart M

Other

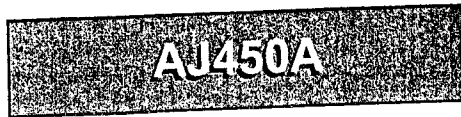
- 5,000 lb. anchorage point
- Includes 20 16D nails for single use
- Accommodates various roof pitches (peaked/sloped/flat)

Please note: The AJ730A MUST be secured to the roof with the nails provided in order to insure proper operation. In addition, if the stability or integrity of the roof is in question, it should be certified as capable of meeting the anchorage strength requirements before this device is used.

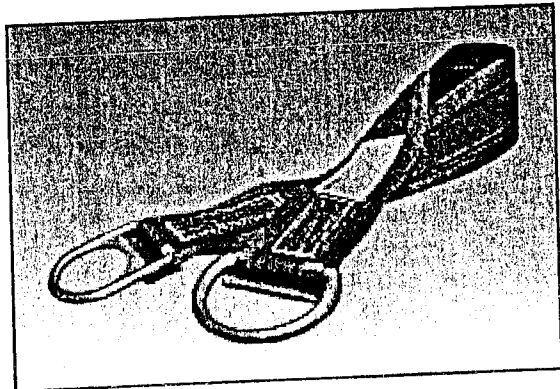


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Webstrap Anchor Sling



The AJ450A Webbing cross-arm strap is ideal to wrap around I-beams, concrete beams, or other structures, creating a secure anchor point. It is easy installed by passing a 2" D-ring through a 3" D-ring and pulling taut. The AJ450A is designed with a 3" cut and scuff guard to provide longer life. It comes in two standard lengths (3' and 6'). Custom lengths are available; contact PROTECTA for more information

FEATURES:

- 5,000 lb. anchorage point
- Easy to install
- Accommodates a wide variety of different size structures
- 3" scuff/cut guard provides extended life
- 6' standard length available-Part # AJ450A6
- Custom lengths available
- Lightweight
- Meets OSHA 1910/1926 & ANSI A10.14-1991/ANSI Z359.1-1992 standards

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Lanyards



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DBI-SALA Shock-Absorbing Lanyards

DBI-SALA ShockWave™ EZ STOP® II Shock Absorbing Lanyards



MILLER 6' Lanyards



MILLER BackBiter™ Tie-Back Lanyards



MILLER Manyard II® Shock Absorbing Lanyard



MILLER Manyard® Shock-Absorbing Lanyards



MILLER® Minilite Fall Limiters



MILLER Retractable Webbing Lanyard



MILLER Sofstop Shock Absorbers



MILLER® HP™ Lanyards with Sofstop Shock Absorbers



MILLER® Manyard® HP™ Shock-Absorbing Manyards



MSA FP Aptura Self-Retracting Lanyard

1. How many lanyards...

100 lanyards

05.A.07 Minimum requirements.

a. Employees shall wear clothing suitable for the weather and work conditions: the minimum for fieldwork (i.e., construction sites, industrial operations and maintenance activities, emergency operations, regulatory inspections, etc.) shall be short sleeve shirt, long pants (excessively long or baggy pants are prohibited), and leather or other protective work shoes or boots.

b. Protective equipment shall be of heat/fire/chemical/electrical-resistive material when conditions require protection against such hazards.

05.A.08 Protective footwear, such as rubber boots, protective covers, ice cramp-ons, and safety-toed boots, shall be worn by all persons exposed to hazards to the feet (including, but not limited to, puncture, slipping, electrical, or chemical hazards).

a. For all activities in which USACE or contractor personnel or official visitors are potentially exposed to foot hazards, the applicable PHA/AHA, APP, or project safety and health plan shall include an analysis of, and prescribe specific protective measures to be taken for, reducing foot hazards.

b. USACE and Contractor personnel shall, as a minimum, wear safety-toed footwear meeting ANSI Z41 while working on construction sites unless it can be demonstrated by a PHA/AHA to the GDA satisfaction that a different type of foot protection is required.

c. Footwear providing protection against impact and compressive forces, conduction hazards, electrical hazards, and sole puncture shall meet the applicable requirements of ANSI Z41; footwear providing protection against impact and compression hazards shall be rated as I75 and C75.

d. Unexploded ordnance (UXO) sweep personnel shall have no metal parts in or on their footwear.

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signs indicating both the presence of hazardous noise levels and the requirement for hearing protection.

05.D HEAD PROTECTION

05.D.01 All persons working in or visiting hard-hat areas shall be provided with and required to wear Type I or Type II, Class G (General - low voltage electrical protection) or Class E (Electrical - high voltage electrical protection) headgear. For emergency response operations and other activities with greater need for side impact protection, Type II head protection is recommended. >See Appendix B.

- a. Hard-hat areas are those areas with potential hazard of head injury: all construction areas are considered hard-hat areas. The identification and analysis of head hazards will be documented in a n AHA, APP, or project safety and health plan, as appropriate.
- b. Hard-hat areas shall be general areas (such as dredging, construction, alteration, demolition, quarry, or similar field activities) rather than specific portions of a building or project.
- c. All points of entry to a hard-hat area shall have a sign warning of the requirement to wear hard hats.

05.D.02 All protective headgear shall meet the requirements of the current ANSI Z89.1.

- a. No modification to the shell or suspension is allowed unless approved by the manufacturer.
- b. Hard hats shall be worn with the bill facing forward.
- c. Protective headgear worn near electric lines and equipment shall be Class E.

d. No ball caps, knit caps, or other headdress shall be worn under the hard hat that could interfere with the fit or stability of the hard hat unless approved by the manufacturer.

05.D.03 Protective headgear and components shall be visually inspected on a daily basis for signs of damage (dents, cracks, etc.) that might reduce the degree of safety originally provided. Headgear will periodically be inspected for ultraviolet degradation as evidenced by cracking or flaking of the helmet.

05.D.04 Drilling holes or in any way changing the integrity of the hard hat is prohibited.

05.D.05 Protective headgear worn by USACE employees shall (in addition to complying with the preceding specifications) be:

a. White in color and marked with a 1-in (2.5-cm) band of red reflective material placed along the base of the crown with a 5 in (12.7 cm) break in front. A red Corps of Engineers castle insignia, meeting specifications of Engineering Regulation (ER) 385-1-6, will be centered at the front of the hat with the base of the insignia approximately 3/4 in (1.9 cm) above the base of the crown. Personnel may place their name above the insignia and their organization title below the insignia; the rank of military personnel should precede their name. An American Flag insignia may be worn on the back of the hard hat.

b. Local use of the sides of hard hats for safety decals is authorized.

c. Alterations that will reduce the dielectric or impact strength will not be made.

d. Requests for variations in color and marking to accommodate occupational specialties should be submitted for consideration to HQUSACE Safety and Health Office.

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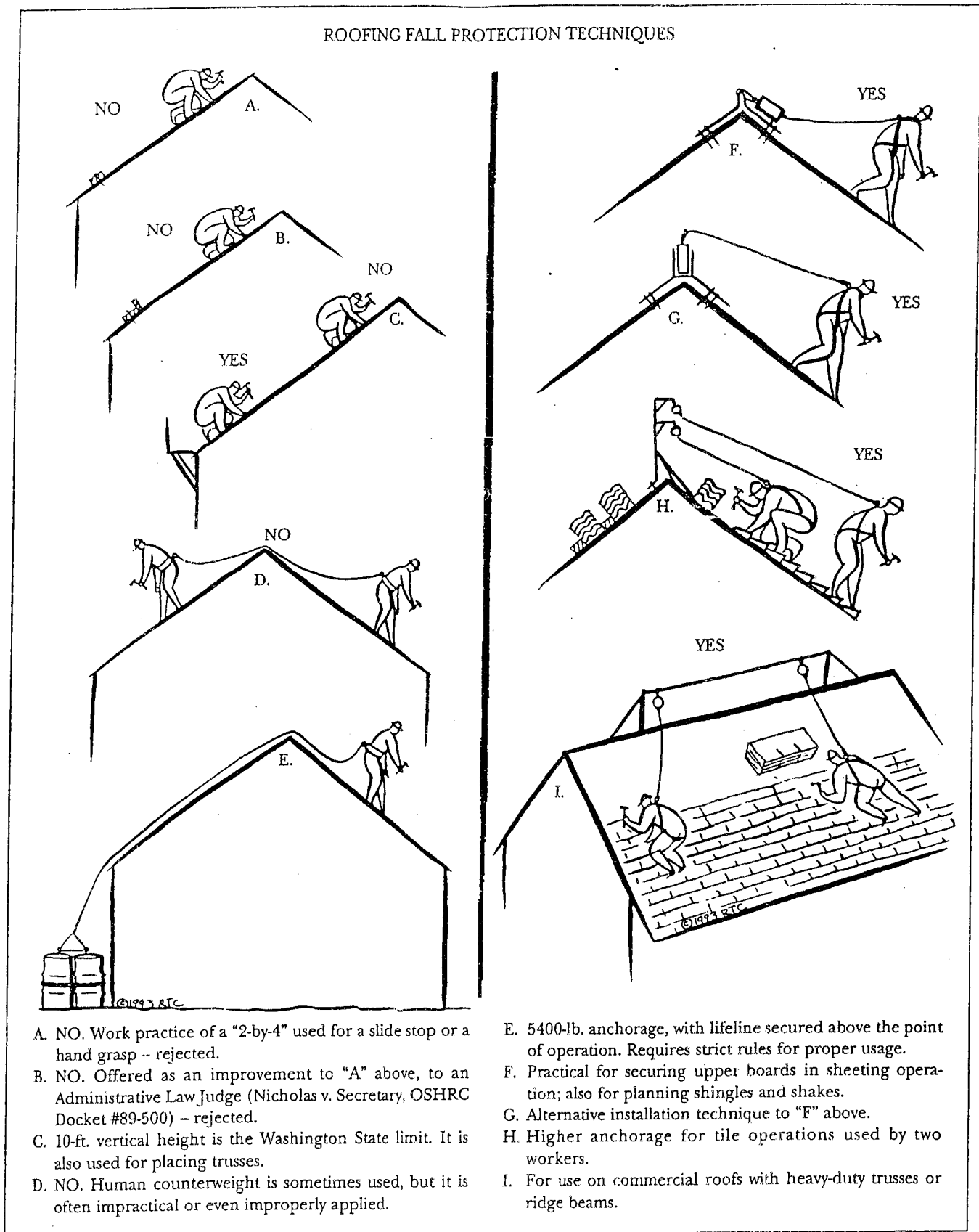
05.D.05 Protective headgear worn by USACE employees shall (in addition to complying with the preceding specifications) be:

a. White in color and marked with a 1-in (2.5-cm) band of red reflective material placed along the base of the crown with a 5 in (12.7 cm) break in front. A red Corps of Engineers castle insignia, meeting specifications of Engineering Regulation (ER) 385-1-6, will be centered at the front of the hat with the base of the insignia approximately 3/4 in (1.9 cm) above the base of the crown. Personnel may place their name above the insignia and their organization title below the insignia; the rank of military personnel should precede their name. An American Flag insignia may be worn on the back of the hard hat.

b. Local use of the sides of hard hats for safety decals is authorized.

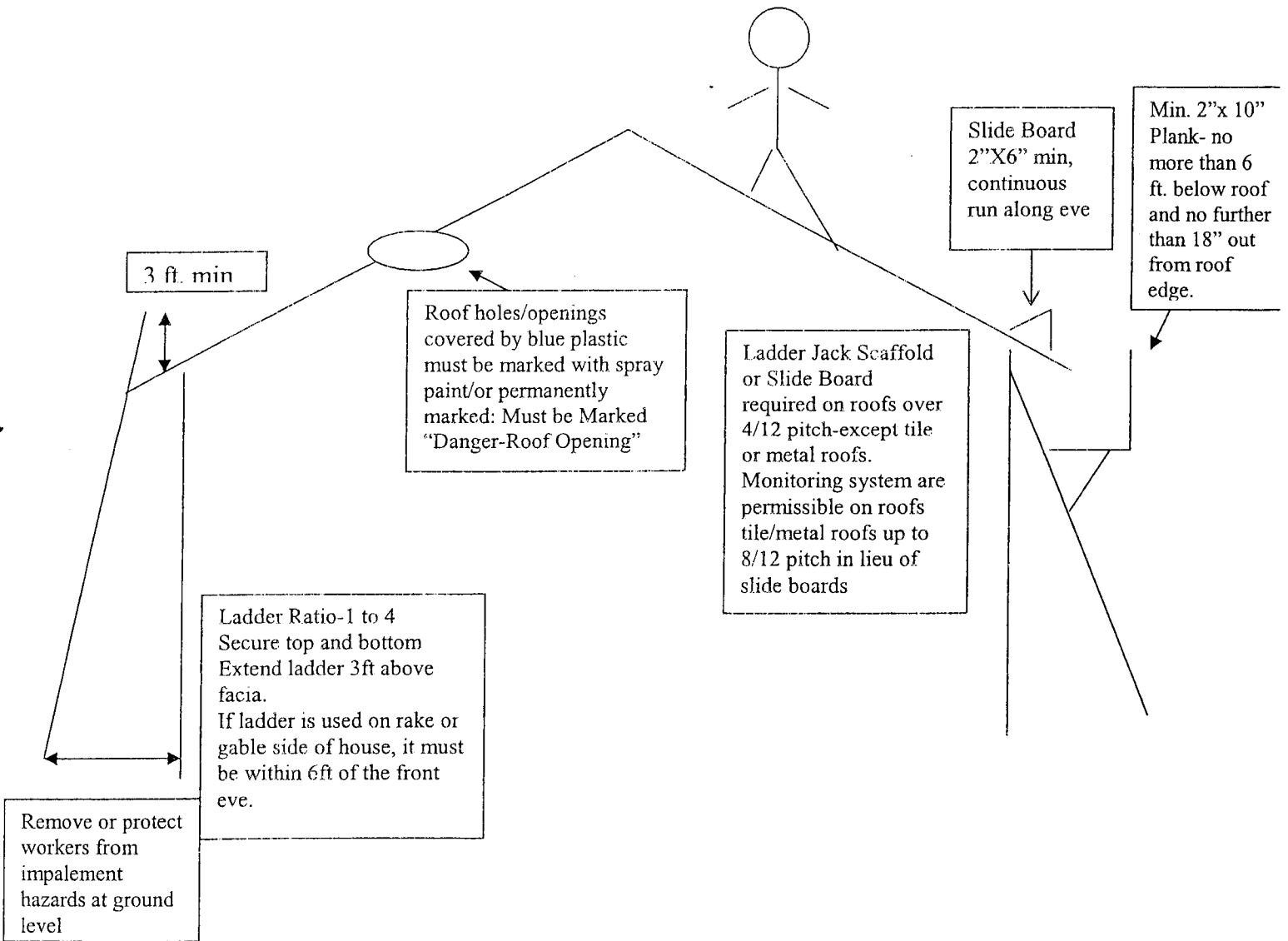
c. Alterations that will reduce the dielectric or impact strength will not be made.

d. Requests for variations in color and marking to accommodate occupational specialties should be submitted for consideration to HQUSACE Safety and Health Office.

**FIGURE 9.2**

This illustration of roofing fall protection techniques does not address gable fall protection techniques.

Residential Roofing Fall Protection Guidance Hurricane Frances Recovery



Note: Personal fall arrest is not required on roofs less than 25 ft in height with less than 4/12 pitch. Roofs with pitches greater than 4/12 but less than 8/12 require the use of alternate procedures such as slide boards or scaffolding if personal fall protection is not required.

All roofs greater than 25 ft. require personal fall protection, and all roofs greater than 8/12 pitch no matter what height requires personal fall protection.

Fall restraint systems are preferred over fall arrest systems in that they restrict a worker from reaching the roofs edge. If using fall arrest systems you must make sure there is enough ground clearance. For example: 6 ft lanyard + 3 ft. stretch + 5 ft. height of man = 14 ft minimum. Any fall distance shorter than this would allow the worker to contact the ground before the system is activated. Roof anchors need to be 5,000 lb rated.

Reference Hurricane Frances Fall Protection Variance 01-04 and OSHA Directive STD 03-00-001.

Guidance for Waiver/Variance

The contractor to comply with EM 385-1-1, 3 Nov 2003 edition on all items except section 21.A.15 and 27.H.

Fall Protection Plan must be in writing and developed by Qualified Person. (Appendix Q-56 of EM 385-1-1 for Qualified Person requirements)

Contractor must have competent person for fall protection on site with each crew. (See Appendix Q-14 of EM 385-1-1 for competent person definition)

Inspectors can access roofs to access damage, make measurements, and to assess fall protection requirements. (No height restriction designated) 1926.500 (a) (1)

The employer shall determine if the walking/working surfaces on which its employees are to work have the strength and structural integrity to support employees safely. Employees shall be allowed to work on those surfaces only when the surfaces have the requisite strength and structural integrity. 1926.501(2)

Fall Protection Plans will be made project specific on site by competent person. These changes do not have to be in writing. STD 03-00-001

Fall protection requirements for residential construction are set out in 29 CFR 1926.501(b)(13). In general, that provision requires conventional fall protection for work at or over six feet. However, OSHA Instruction STD 3.1 modifies those requirements. It permits employers engaged in certain residential construction activities to use alternative procedures routinely instead of conventional fall protection. No showing of infeasibility of conventional fall protection is needed before using these procedures.

Safety Monitors and Slide Guards (for roofs with an eave height of up to and including 25 feet).

1. Roof Slope (Any Roof Type): Up to 4 in 12. The employer must use either a safety monitoring system that complies with 1926.502, or roofing slide guards. If slide guards are used, they must be built and installed in accordance with the requirements set out below.

2. Roof Slope (Except Tile or Metal Roofs): Over 4 in 12 (and up to 8 in 12): Slide guards are required.

3. Roof Slope (Tile or Metal Roofs): Up to (and including) 8 in 12: The safety monitoring system may be used instead of slide guards.

4. Roof Slope (Any Roof Type): Over 8 in 12: Alternatives to the requirements of the standards are not available.

5. Eave Height Over 25 feet (Any Slope, Any Roof Type): Alternatives to the requirements of the standards are not available.

Roof opening and holes covered by blue plastic must be marked with spay paint or equal permanent marking and marked "Danger Roof Opening."

Fall protection plan to comply with OSHA 1926.502 (k) if residential construction option to be used.